

**REMARKS**

**Status of Claims and Amendment**

Claims 1-18 are cancelled. New claims 19-37 are added by way of this Amendment. Support for new claims 19-37 can be found throughout the specification, for example at pages 1-6 and 12-14. The new claims are also supported by the original claims as follows:

New claim	Original claim(s)
19	1
20	1, 16
21	17
22	1, 18
23	1, 15
24	2
25	3
26	4
27	5
28	14
29	7
30	1-5, 9-15
31	7
32	6
33	6, 16
34	17
35	6, 18

36 1-6,9-15

37 1

Support for the amendment to the specification can be found at page 17, where dopant 2b is defined as hexadecyl-dimethyl-ethylammonium hexafluorophosphate. In view of the above the  $\text{PB}_6^-$  is amended to  $\text{PF}_6^-$ .

Entry and consideration of this amendment are respectfully requested.

**Response to Rejections Under 35 U.S.C. § 102 (b)**

At page 2 of the Office Action, claims 1-18 are rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by "Liquid Crystal Compositions, Method and Devices", XP002264647, *Research Disclosure*, 12512: 14-16, 1974, and by Bucher *et al.* (U.S. Patent No. 3,963,638).

According to the Examiner, XP002264647 discloses an ionic dopant for use in a smectic A liquid crystal composition, wherein the dopant comprises a sulfur-containing anion with a random cation. Further, the Examiner asserts that Bucher *et al.* disclose that the dynamic scattering properties of a nematic liquid crystalline composition having a negative dielectric anisotropy are improved by adding an organic salt containing a sulfonate anion. The Examiner also asserts that the dopant of Bucher *et al.* produces scattering in normally non-scattering negative dielectric anisotropy liquid crystals and reduces the threshold voltage for those already exhibiting scattering properties.

Finally, the Examiner states that the disclosure encompasses each of claims 1-18.

Claims 1-18 are canceled, thus mooted this rejection. To the extent that new claims 9-37 reflect the subject matter of original claims 1-18, Applicants assert that they are free of the cited references.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." (See *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987)). The cited references are not related to an ionic dopant for use in a smectic A liquid crystal composition but rather disclose a dopant for use in a nematic liquid crystal composition. Applicants respectfully submit that nematic and smectic are two different liquid crystal phases. Smectic phases are further classified as smectic A and smectic C phases based on the orientation of the molecules. Furthermore, the specification at page 2 discloses that dopants have been used in nematic devices in the past, however their connection with smectic A liquid crystals is only known to a limited extent.

In addition, while Bucher *et al.* disclose the effect of dopants on the threshold voltage for the onset of electro-hydrodynamic instabilities, and the voltage required to produce dynamic scattering, Bucher *et al.* do not disclose the effect of dopants on the driving voltage of the smectic A liquid crystal device

In view of the above, the new claims are novel over the cited references.

Accordingly, the references as cited by the Examiner fail to anticipate Applicants' claimed invention. Reconsideration and withdrawal of the rejections under § 102 (b) is respectfully requested.

#### **Additional Comments Regarding Other References**

Furthermore, with respect to the five documents cited in the Information Disclosure Statement filed herewith, four (GB1434275, JP51047587, Chem Abs 1976:551844 and

DE19953830), do not relate to smectic A liquid crystals. Only one of the five documents disclosed, namely Mol Cryst. Liq. Cryst., relates to smectic A liquid crystals.

The new claims are novel and inventive over all of the documents cited in the Information Disclosure Statement filed March 4, 2005 and the Information Disclosure Statement filed herewith for the following reasons.

Different types of liquid crystals generally require the use of different dopants. This is because different types of liquid crystals have different structures and differ in other characteristics such as dielectric anisotropy (negative in nematics, but positive in smectics). Therefore one of ordinary skill in the art would not be motivated to use compounds used to dope nematic liquid crystals, to dope smectic A liquid crystal compositions. Therefore, there would be no expectation that the compounds used to dope nematic liquid crystal compositions would reduce the driving voltage of a device comprising a smectic A liquid crystal composition and enhance dynamic light scattering of a smectic A liquid crystal compositions.

Only one document, namely Mol. Cryst. Liq. Cryst., relates to smectic A liquid crystals. Mol. Cryst. Liq. Cryst. discusses the conductivity and mobility of six different salts used to dope a smectic A liquid crystal composition. The salts include N-hexadecylpyridinium p-toluenesulphonate, N-hexadecylpyridinium bromide, N-hexadecylpyridinium tetraphenylborate, and dicyclohexyl-18-crown-6 sodium p-toluenesulphonate. The newly added composition claims are novel over Mol.Cryst.Liq.Cryst. because they do not include the salts disclosed in this reference.

Furthermore, Mol.Cryst.Liq.Cryst. does not disclose or suggest any devices, namely the composition in a device. In view of the above, reducing driving force of the device and enhancing

dynamic light scattering of the composition as instantly claimed are unexpectedly superior properties.

New claims 23-29 do not cover these four salts, because they are limited to phosphorous containing anions.

New claims 30-35 do not cover these four salts, because part (a) does not refer to X being  $\text{SO}_3$ ; part (b) does not refer to X being  $\text{SO}_3$ ; part (c) does not refer to m being 0; part (d) does not refer to R being  $\text{R}^1\text{R}^3$  or  $\text{R}^1-(\text{CH}_2)_p-\text{R}^3$ ; part (e) does not refer to  $\text{R}^1$  being a phenyl, a substituted phenyl or an aromatic ring; part (f) does not refer to  $\text{R}^3$  being an alkyl chain; part (g) does not refer to  $\text{R}^3$  being an alkyl chain; part (h) is limited to chiral anions; part (i) does not refer to an N-alkylpyridine; part (j) does not refer to  $\text{R}^4$ ,  $\text{R}^5$  and  $\text{R}^6$  being pyridines; part (k) does not refer to  $\text{R}^3$  being a hydrogen or an alkyl chain; part (l) does not refer to pyridines; part (m) is limited to specific cations; part (n) is limited to chiral cations; and part (o) is limited to specific dopants.

New claims 36 and 37 do not cover these four salts, because part (a) is limited to phosphorous containing anions; part (b) does not refer to X being  $\text{SO}_3$ ; part (c) does not refer to X being  $\text{SO}_3$ ; part (d) does not refer to m being 0; part (e) does not refer to R being  $\text{R}^1\text{R}^3$  or  $\text{R}^1-(\text{CH}_2)_p-\text{R}^3$ ; part (f) does not refer to  $\text{R}^1$  being a phenyl, a substituted phenyl or an aromatic ring; part (g) does not refer to  $\text{R}^3$  being an alkyl chain; part (h) does not refer to  $\text{R}^3$  being an alkyl chain; part (i) is limited to chiral anions; part (j) does not refer to an N-alkylpyridine; part (k) does not refer to  $\text{R}^4$ ,  $\text{R}^5$  and  $\text{R}^6$  being pyridines; part (l) does not refer to  $\text{R}^3$  being a hydrogen or an alkyl chain; part (m) does not refer to pyridines; part (n) is limited to specific cations; part (o) is limited to chiral cations; and part (p) is limited to specific dopants.

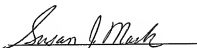
New claims 19-22 are novel over the references because the claims recite the effects of reducing the driving voltage of a device comprising a smectic A liquid crystal composition and of enhancing dynamic light scattering of the composition

**Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

  
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**23373**

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